SHAPE CONFORMING SURFACE COVERING

The present invention relates to a shape conforming surface covering useful for covering a floor surface, a wall surface, a boat or yacht deck, floor boards in boats and yachts, bath and shower room floors and walls coverings, swimming pool surroundings, curved floor plans inside and outside buildings, claddings and coverings of many other types of surface recipients, including decoration. The surface covering according to the invention is formed by strips of an flexible material and is adapted for being laid in slightly curved formation where necessary, and it is generally intended to imitate a type of deck made by teak, mahogany, oregon pine etc. and which is sometimes formed with narrow seams by a rubber type material, which is normally of a contrasting colour, often black.

There are in use many surface coverings, many of which are made of straight planks with a version of the present invention easily being usable. Some applications, however, require conformity to curved shapes of the covering base. A typical example is teak planked deck of a yacht. Such surfaces have to be of a good, non slip character, and have to be at least fairly unaffected by water and have to look attractive. Wood, such as teak has been used for many years, but such wooden material is in many ways impractical and of relatively short lifespan. Curved wooden surfaces necessitate considerable stressing, preparation like adapting of the wooden ribs to any curved surface, fixing by screws, use of sealing compound and regular maintenance, especially scrubbing, oiling and varnishing and the use of pollutant, cleaning chemicals on a regular basis and in large amounts on boat, in particular these chemicals drain into the surrounding water. Curved wooden ribs or planks also involve an inherent spring stress requiring a strong fixation, generally using screws or bolts. Further, the new look of a teak deck is lost within weeks, and the whole deck requires major work or replacement in four to sex years on average.

Ecologically this invention does not require the cutting down of trees

and is recyclable. The invention can take the place of tropical hardwoods used throughout the world in many applications.

The present invention is adapted to suggest a shape conforming surface covering comprising lengths of ribs of mostly the same cross section, but with differing cross sections included within the surface or at its edges or ends as required, of specifically shaped plastic material, which plastic ribs are of such flexibility that then can be made follow at least slightly curved surfaces, tight curves being attainable with the use of heat. The lengths of ribs are adapted to be connected edge to edge in various combinations to form collectively the required size and shape of the surface to be covered. A variation of the invention can be produced with the same material and finish in other cross sections to used for the edges of steps for example, or other functional or decorative applications. Normally a jointing compound must be used on wooden decks, but according to the invention the individual planks and/or caulking strips are malleable, becoming more and more malleable at increasing temperatures. According to the present invention the need for these "later applied" compound along the joints is no longer necessary. The new shapes or curves taken up by the planks or caulking strips become a relatively stress free feature of these planks or caulking strips unless re-adjustement is necessary, whereby re-adjustment can be made by applying heat to the strips, for instance using a hot air gun, hot water, radiant heat etc.

The planks and strips preferably are formed by extrusion of a plastic material and with matching locking means along the longitudinal edges thereof, preferably groove and tenon means. The planks likewise can be formed with narrow strips of a different coulour imitating seams of the type used in applying wooden deck on a yacht. The colours of the described planks and strips can easily be changed in the manufacturing extrusion process.

The surface covering as assembled, complete or in sections, is fixed to

the recipient surface by means of an adhesive, and to this end the planks and strips preferably are formed with a suitable bottom surface facilitating the fixing of the covering. There is no need for using screws or bolts and associated holes because captive springing is not a problem as is normally the case with wooden planking made to confirm with a curvature.

The surface covering according to the invention can be subjected various mechanical an manual abrasive techniques for specifically forming the surface of the plastic material such as sanding under specific conditions to provide a surface effect which is extremely similar to that of grained wood both in texture and appearance.

The surface covering according to the invention is advantegous in several respects over ordinary wooden coverings of similar types:

it is completely waterproof; it is easily washable to look new every time, even jet washable what is not possible for ordinary wooden coverings since jet washing is damaging the wood grain; it is extremely non slip, it is extremely stain resistant; it is easy to assemble; it can easily be laid in curvature; it can easily be shaped using heat; there is no need for using nails, screws or bolts for fixing same to the recipient; it is throughout a solid or an integral material which can be sanded repeatedly upon need.

Now the invention is to be described in detail by way of examples and with reference to the accompanying drawings, in which:

Figure 1 is a fragmentary perspective view of two plank sections with an intermediate caulking strip; figure 2 shows a similar assembled surface with caulking strips in place between the planks; figure 3 is a section showing a planking assuming a curved shape, and figure 4 shows an assembled surface in a curved format; figure 5a, b, c, d, e, f, g, h, i, and j show cross section examples of methods that can be used to incorporating caulking strips into the surface, figure 5k (1, 2, 3, 4) shows examples of profiles to complete requirement for edgings, cutting out of shapes etc. to comprises a 'system' or compendium of shapes and profiles; figure 6

illustrates various examples of under-surface cross sections; figure 7 illustrates a belt sanding operation; figure 8 illustrates an alternative texturing technique; figure 9 shows an alternative abrasive tool 14a that can be used to produce the wood grain effect surface; figure 10 illustrates an assembled curved section of a surface in plan view; figure 11 illustrates a way of laying the surface.

Figure 1 shows a surface covering comprising planks 1 and 2 with an intermediate caulking strip 3 between each pair of planks. In the illustrated case the planks 1, 2 are formed with male connection means 4 along one longitudinal edge and female connection means 5 along the opposite longitudinal edge. The caulking strips are formed with equivalent male and female connection means arranged so that a set of planks 1, 2 and intermediate caulking strips 3 provide an integral unit. Adhesive being used in the joint if necessary. Any number of planks 1, 2 can be connected to each other, both with and without intermediate caulking strips 3. The underside of the plank can be formed with a number of recesses 6, which both facilitate a curving of the plank, as illustrated in figure 3, and form a connection means for glue or a similar material by means of which the surface covering is glue connected to surface covering recipient 7, as illustrated 11.

In a version of the invention a sheet would be extruded without the caulking strips with the caulking strips co-extruded integral, or with facility to incorporate applied caulking strips.

Both the planks and the caulking strips can be made with different colours, imitating wool like teak, mahogany, pine, oregon pine, redwood, etc. The caulking strips preferably are made of another colour than the planks, for instance a black colour imitating the rubber material seams in seamed decks of yachts. It also retains its colour far better than its' natural wood alternative.

Figure 6 illustrates different types of useful under side surface profiles. The cross sections of the various profiles can also include provision for

insertion of rigid or injected foam of lighter material to reduce the overall weight, and/or for insulating purposes. The planks 1 and 2 and the caulking strips 3, including the male and female connection means 4, 5 and under surface recesses 6 can be formed in endless lengths by any known process, like injection press extrusion of press moulding. The planks 1 and 2 preferably are formed by a plastic material which is stiff enough for keeping the planks and caulkings together as an integral unit, but which can still be formed in a curvature adapted to the curvature of the recipient 7. Planks can be joined in the longitudinal direction as shown with planks 8 and 9 an a cross extending caulking strip 10 in figure 2. The planks can be formed in a curvature preferably using heat from a hot air gun or a hair dryer 11, as indicated in figure 3. Figure 4 fragmentarily shows a curved surface covering consisting of three planks and intermediate caulking strips.

The planks and the caulking strips can be arranged for interconnection in several ways. In figures 5a and 5e is shown that the planks and the caulking strips have straight side edges and are adapted to be connected by glue or by a welding process; figure 5b, c, e and f illustrate interconnection of the planks and the caulking strips by means of male and female connection means, and figure 5d illustrates an interconnection using overlapping portions of the planks and the caulking strips. Figure 5f illustrates that the planks 12 can be co-extruded with a caulking strip 13, whereby, in the illustrated case, the caulking strip 13 is formed with male connection means 4 and the plank 12 is formed with female connection means 5. Figure 5g shows a co-extruded plank and caulking strip with the male connection means in the caulking strip; figure 5h shows an equivalent co-extrusion in which the caulking strip is formed with female connection means. Figure 5i shows an example of how the upper surface joining profile enables a locking process to take place where the edges are prevented from lifting when the product is assembled, with or without the caulking part of the co-extrusion being under compression upon joining. The male and female connection means are

provided in the plank parts, and a caulking strip is applied as a narrow strip on top of a part of the male connection means. Figure 5j shows an embodiment where a section of the plank or of the profiles used in particular applications is filled with foam of a light weight material. Other examples of profiles with or without foam filling to requirements for edgings, cutting out of shapes etc. to comprises a system or compendium or shapes and profiles are shown in figure 5k (1, 2, 3, 4).

In any of the examples the caulking strip could be a softer material than that of the plank to come under compression, captive or otherwise when the product is assembled

Figure 6 shows a cross section of an extruded plank, in which there are shown, for illustrative purposes, several types of bottom surface recesses

For giving the planks, and the caulking strips a configuration similar to that of wood, the planks are, according to the invention, sanded, for instance using a belt sander 14 a shown in figure 7. The belt sander is brought to attack the plank, specifically using the curved or roller part of the sanding belt, in an angle of for instance 45° and is moved along the plank in direction shown with the arrow. A rotary wire brush can also be used in specific conditions to produce a desired effect, in required. At the same time as giving the planks a wooden like surface structure said sanding makes the upper surface of the surface covering an extremely non slip structure. The sanding operation can be repeated a great many times, even in the laid surface covering.

Figure 8 shows an alternative type of sanding the planks, whereby the belt sander acts at an angle of about 60° to the longitudinal direction of the planks. Said angular strokes across the surface will produce individual effects using a powerfile 15.

Figure 9 shows diagrammatically how an abrasive rotary tool can be used to produce the wool grain effect on the upper surface of the plank. By changing certain certain conditions various effects can be obtained like the

meeting angle 16 in figure 7, the speed of rotaion in figure 9, the coarsness of grit, the direction of stroke 17, which conditions are of importance to react with the formulation of the plastic surface to produce the unique grain effect.

Figure 10 shows an example of use of a piece of surface covering or a curved border type plank mounted in contact with another cross extending border plank, like a plank sheer of a yacht.

The assembled surface covering material 18 is glued at the bottom side thereof and laid as shown in figure 11 by rolling the back of the covering material onto the recepient surface 19. Cutting and trimming of the surface covering is readily achieved, for instance with the use of a sharp knife.

REFERENCE NUMERALS

1	plank
2	plank
3	caulking strip
4	male connection means
5	female connection means
6	recess
7	recipient
8	plank
9	plank
10	cross caulking strip
11	hot air gun, hair dryer
12	plank
13	caulking strip
14	belt sander
14a	abrasive tool
15	powerfile
16	angle
17	direction of stroke
18	covering material
19	recipient surface